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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/594,437	12/12/2006	Takeshi Sakamoto	129510	6860

25944 7590 06/10/2010

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EXAMINER	
HARRIS, GARY D	

ART UNIT	PAPER NUMBER
1785	

NOTIFICATION DATE	DELIVERY MODE
06/10/2010	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/594,437	SAKAMOTO ET AL.	
	Examiner	Art Unit	
	GARY D. HARRIS	1785	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 February 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,4-10,18-34,36 and 38-51* is/are pending in the application.

4a) Of the above claim(s) *18-30 and 38-51* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,4-10 and 31-46* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

2. Claims 1, 2, 4-10 and 31-41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kako et al. JP 2004-002911 in view of Hamada US 5,316, 595.

As to Claim 1, JP 2004-002911 discloses a rare earth magnet (Paragraph 002 & 004) and a surface of a permanent magnet containing a rare earth element as a primary component is melted (Paragraph 4) and then quenched to form an amorphous layer (Paragraph 5) where the amorphous layer contains elements from the magnetic body (rare earth materials constituting all elements of the magnetic body) (Paragraph 005).

JP '911 discloses the protective layer is a Ni-plated (metal) layer (see drawing 4) provided on a surface of the amorphous layer (Paragraph 0002).

JP '911 is silent to a chemical conversion treatment of the amorphous layer on the amorphous layer.

However, Hamada US 5,316, 595 discloses a rare earth permanent magnet (Fe-B-R) having an anti-corrosion layer formed by means of vapor deposition (see abstract). A vapor deposited metal is used for deposition such as aluminum, chromium or titanium (Col. 6, Line 5-30). The metals may be amorphous or crystalline (Col. 6, Line 23-24) and form an oxide on the surface during heat treatment which is then passivated (oxidized) to introduce a further improvement in corrosion resistance. Heat treatment and shot peening (to oxidize the surface) are both carried out during heat treatment (Col. 13, Line 41-48). The shot peening is applied prior to vapor deposition to roughen the surface and promote vapor deposition adhesion (abstract & Col. 5, Line 31-42 & Col. 13, Line 33-40).

It would have been obvious to one of ordinary skill in the art to incorporate a passivation layer passivated by chemical conversion treatment of the amorphous layer on the amorphous layer as taught by Hamada as this would improve the corrosion resistance of the film. One would have been motivated to include the passivation layer (oxidized) in the JP '911 invention as this would roughen the surface and promote vapor

deposition. One of ordinary skill would recognize that an oxidized surface allows for improved corrosion resistance.

As to Claim 2, JP '911 discloses the rare earth magnetic body containing rare earth amorphous layer formed on the magnetic body is produced by a laser method (similar to applicant's) and produces an amorphous layer (amorphization of the magnetic body) (Paragraph 007). Regarding the new limitation where the magnetic body and around a boundary between the body and the amorphous layer, a crystal phase is mixed with an amorphous phase at the boundary between the magnet body and the amorphous layer. JP '911 would meet this limitation as the magnetic body has a crystalline structure as the magnetic body is fused using a YAG laser. Following the fusing process an amorphous layer is applied surrounding the fused (crystalline) layer (Paragraph 0005).

As to Claim 4, JP '911 discloses a rare earth magnet such as NdFeB (Paragraph 002 & 004) and a surface of a permanent magnet containing a rare earth element as a primary component is melted (Paragraph 4) and then quenched to form an amorphous layer (Paragraph 5). The amorphous layer contains elements from the magnetic body (rare earth materials identical to main component elements of the magnetic material) (Paragraph 005). A Ni-plated layer (see drawing 4) (protection layer) is formed on a surface of the amorphous layer (Paragraph 0002).

Regarding the protective layer containing aluminum, JP '911 protective layer is a nickel protective layer and is silent to an aluminum protective layer.

However, Hamada US 5,316, 595 discloses a rare earth permanent magnet (Fe-B-R) having an anti-corrosion layer formed by means of vapor deposition (see abstract). A vapor deposited metal is used such as aluminum, chromium or titanium (Col. 6, Line 5-30). The metals may be amorphous or crystalline (Col. 6, Line 23-24) and form an oxide on the surface during heat treatment and is then passivated (oxidized) to introduce a further improvement in corrosion resistance. Heat treatment and shot peening (to oxidize the surface) are both carried out during heat treatment (Col. 13, Line 41-48). The shot peening is applied prior to vapor deposition to roughen the surface and promote vapor deposition adhesion (abstract & Col. 5, Line 31-42 & Col. 13, Line 33-40).

It would have been obvious to one of ordinary skill in the art to utilize an aluminum passivation layer passivated by chemical conversion treatment of the amorphous layer on the amorphous layer as taught by Hamada as this would improve the corrosion resistance of the film. One would have been motivated to include the aluminum passivation layer (oxidized) in the JP '911 invention as this would roughen the surface and promote vapor deposition. One of ordinary skill would recognize aluminum as an easily oxidized material used on a surface would allow for improved corrosion resistance in the form of aluminum oxide.

As to Claim 5, JP '911 discloses the magnetic body having an Nd rich phase (polycrystalline) similar to applicant (Paragraph 003).

As to Claim 6, JP '911 discloses the rare earth magnet is made by fusing the surface with a laser and then quenching to produce the amorphous layer. Since the materials are not changing only the characteristics of the surface they would have the same elemental compositions as claimed (Paragraph 005).

As to Claim 7, JP '911 discloses a pickling pretreatment prior to Ni-plating (Paragraph 0005) and the amorphous treatment of the surface by using a laser.

JP '911 is silent in regards to the arithmetic mean roughness Ra ranging from 0.1-1.5 microns.

However, Hamada discloses a surface roughness of the magnet is dependent upon the powders selected, the particles size used during blasting, hardness of the powders and the time in the blasting chamber in obtaining a suitable surface for deposition and adhesion to the magnetic body (Col. 9 & 10, Line 53-68 & 1-23 respectively).

It would have been obvious to one of ordinary skill in the art to adjust the surface roughness in JP '911 invention using grit size, hardness or time in the blasting chamber in order to obtain a suitable surface for deposition and adhesion to the magnetic body. One would have been motivated to roughen the surface by any method such as laser treatment, physical treatment or chemical treatment depending on processing preference as this would provide an improvement in surface adhesion.

As to Claim 8, JP '911 discloses a surface of a permanent magnet containing a rare earth element as a primary component is melted using a laser beam, an electron beam, or the like (bombarding the surface of the magnetic body with solid particles or particle beams to denature the surface), in creating the amorphous layer (Paragraph 0007).

As to Claim 9, JP '911 discloses the amorphous layer on said permanent magnet is 15 microns (Paragraph 0005).

As to Claim 10, JP '911 discloses a rare earth magnetic body containing a rare earth element (NdFeB) (Paragraph 002 & 004). On the surface of the permanent magnet is an amorphous layer that is obtained by bombarding the surface with solid particles or particle beams (laser) that would denature the surface of the magnetic body (Paragraph 0007). A Ni-plated layer (see drawing 4) is provided on a surface of the amorphous layer (Paragraph 0002).

Regarding the new limitation where the magnetic body and around a boundary between the body and the amorphous layer, a crystal phase is mixed with an amorphous phase at the boundary between the magnet body and the amorphous layer. JP '911 would meet this limitation as the magnetic body has a crystalline structure as the magnetic body is fused using a YAG laser. Following the fusing process, an amorphous layer is applied surrounding the fused (crystalline) layer (Paragraph 0005).

As to Claim 31, JP '911 discloses the rare earth magnet is made by fusing the surface with a laser and then quenching to produce the amorphous layer. Since the materials are not changing only the characteristics of the surface they would have the same elemental compositions as claimed (Paragraph 005). The protective layer is a Ni-plated (metal) layer (see drawing 4) (passivation) provided on a surface of the amorphous layer (Paragraph 0002)

As to Claim 32, JP '911 discloses the magnetic body having an Nd rich phase (polycrystalline) similar to applicant (Paragraph 003).

As to Claim 33, JP '911 discloses the magnetic body having an Nd rich phase (polycrystalline) similar to applicant (Paragraph 003).

As to Claim 34, JP '911 discloses the rare earth magnet is made by fusing the surface with a laser and then quenching to produce the amorphous layer. Since the

materials are not changing only the characteristics of the surface they would have the same elemental compositions as claimed (Paragraph 005).

As to Claim 35, JP '911 discloses the rare earth magnet is made by fusing the surface with a laser and then quenching to produce the amorphous layer. Since the materials are not changing only the characteristics of the surface they would have the same elemental compositions as claimed (Paragraph 005).

As to Claim 36, JP '911 discloses a rare earth magnetic body containing a rare earth element (NdFeB) (Paragraph 002 & 004). On the surface of the permanent magnet is an amorphous layer that is obtained by bombarding the surface with solid particles or particle beams (laser) that would denature the surface of the magnetic body (Paragraph 0007). A Ni-plated layer (see drawing 4) is provided on a surface of the amorphous layer (Paragraph 0002).

As to Claim 37, JP '911 discloses a rare earth magnetic body containing a rare earth element (NdFeB) (Paragraph 002 & 004). On the surface of the permanent magnet is an amorphous layer that is obtained by bombarding the surface with solid particles or particle beams (laser) that would denature the surface of the magnetic body (Paragraph 0007). A Ni-plated layer (see drawing 4) is provided on a surface of the amorphous layer (Paragraph 0002).

As to Claim 38, JP 2004-00291 discloses the amorphous layer on said permanent magnet is 15 microns (Paragraph 0005).

As to Claim 39, JP '911 discloses the amorphous layer on said permanent magnet is 15 microns (Paragraph 0005).

As to Claim 40-41, JP '911 discloses the protective layer is a Ni-plated (nickel) (metal) layer (chemically converted film) (see drawing 4) is provided on a surface of the amorphous layer (Paragraph 0002).

4. Claims 42 - 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kako et al. JP 2004-002911 in view of Hamada US 5,316, 595 and further in view of Ishizake et al. JP 2000-034503.

As to Claim 42, JP 2004-002911 discloses the protective layer is a Ni-plated (nickel metal) layer (chemically converted film, see drawing 4) is provided on a surface of the amorphous layer (Paragraph 0002).

JP 2004-002911 is silent with regard to an oxide.

However, Ishizake et al. JP 2000-034503 discloses an oxidized silicon coating or a silicon nitride coating on a rare earth magnet as a protective coating (Paragraph

0021), to obtain a precise coating formation (layer) (Paragraph 21). It would have been obvious to one skilled in the art to utilize a silicon oxide and/or nitride coating as a protective layer in order to obtain a precise coating layer.

As to Claim 43 & 45, JP 2004-002911 discloses the protective layer is a Ni-plated (metal) layer (see drawing 4) is provided on a surface of the amorphous layer (Paragraph 0002).

JP 2004-002911 does not disclose an oxide.

However, Ishizake et al. JP 2000-034503 discloses an oxidized silicon coating or a silicon nitride coating on a rare earth magnet as a protective coating (Paragraph 0021), to obtain a precise coating formation (layer) (Paragraph 21). It would have been obvious to one skilled in the art to utilize a silicon oxide and/or nitride coating as a protective layer in order to obtain a precise coating layer.

As to Claim 44, JP 2004-002911 discloses the protective layer is a Ni-plated (nickel) (metal) layer (chemically converted film) (see drawing 4) is provided on a surface of the amorphous layer (Paragraph 0002).

JP 2004-002911 does not disclose an oxide.

However, Ishizake et al. JP 2000-034503 discloses an oxidized silicon coating or a silicon nitride coating on a rare earth magnet as a protective coating (Paragraph 0021), to obtain a precise coating formation (layer) (Paragraph 21). It would have been obvious to one skilled in the art to utilize a silicon oxide and/or nitride coating as a protective layer in order to obtain a precise coating layer. One skilled in the art would immediately recognize that if Ishizake '503 silicon oxide or nitride would serve as a protective layer then a silicon oxynitride would serve a similar purpose.

As to Claim 46, JP 2004-00291discloses the protective layer is a Ni-plated (metal) layer (see drawing 4) is provided on a surface of the amorphous layer (Paragraph 0002).

JP 2004-002911 does not disclose an the protecting layer comprises at least one kind of a resin selected from a group composed of phenolic resin, epoxy resin, melamine resin, and xylene resin.

JP 2000-034503 discloses a protective polymer (phenolic, epoxy, melamine and xylene resin) layer on a permanent magnet provides a degree of protection (Paragraph 0005). It would be obvious to one skilled in the art to utilize a polymer to provide a degree of protection to a permanent magnet.

Response to Arguments

Applicant's arguments (in italics) filed 02/25/2010 are addressed as follows:

The applied references fail to teach or render obvious the recited features of independent claims 1, 2, 4 and 10.
A. Claim 1
The subject matter of claim 3 is incorporated into claim 1. Thus, the rejection of claim 3 is addressed as applied to amended claim 1. The Office Action relies on Fig. 4 and paragraph [0002] of Kako corresponding with the recited passivation layer. However, as discussed below, this reliance is improper. The passivation layer of the present application is formed by a chemical conversion treatment of the amorphous layer on the amorphous layer. This chemical conversion treatment is the treatment of subjecting the surface of the amorphous layer to a chemical reaction, which is different from the coating of another layer on the amorphous layer. See paragraph [0164] of the specification.
On the other hand, the Ni-plated layer of Kako is formed by strike nickel plating and electric nickel plating, which is another layer comprising Ni formed on the amorphous layer. See paragraph [0005] of Kako. Thus, Kako fails to teach or render obvious the passivation layer passivated by a chemical conversion treatment of the amorphous layer on the amorphous layer. Ishizake and Fuji fail to cure the deficiencies of Kako. The applied references fail to teach or render obvious the recited features of independent claim 1.

Applicant argues that the treatment of the chemical conversion treatment is different from coating with another layer. This is not persuasive, as it is known in the art that prior to forming a layer on the surface of a material (media, sand, grit)-blasting (applicant's chemical conversion treatment) is commonly performed to remove oxides from the surface. Surface treatments are well known in the art and include chemical or physical treatments which produce similar results. One of ordinary skill in the art would recognize treating a surface prior to allowing for additional layers to be added. The Kako Ni layer would require some form of treatment prior to electro plating (chemical or physical). It would have been obvious to one of ordinary skill in the art to incorporate a passivation layer passivated by chemical conversion treatment of the amorphous layer on the amorphous layer as taught by Hamada as this would improve the corrosion resistance of the film. One would have been motivated to include the passivation layer (oxidized) in the JP '911 invention as this would roughen the surface and promote vapor

deposition. One of ordinary skill would recognize that an oxidized surface allows for improved corrosion resistance.

B.
Claims 2 and 10
Claims 2 and 10 have been amended to recite "at around a boundary between the magnet body and the amorphous layer, a crystal phase is mixed with an amorphous phase at the boundary between the magnet body and the amorphous layer."
The amorphous layer of Kako is formed by ~ the surface of a permanent magnet material using a laser beam and quenching. In this method of Kako, it appears that the fused part and the non-fused part are clearly divided. Thus, the crystal phase is not mixed with the amorphous phase at the boundary. Accordingly, Kako fails to teach or render obvious that at around a boundary between the magnet body and the amorphous layer, a crystal phase is mixed with an amorphous phase at the boundary between the magnet body and the amorphous layer. Ishizake and Fuji fail to cure the deficiencies of Kako. The applied references fail to teach or render obvious the recited features of independent claims 2 and 10.
C.

Applicant's arguments are not persuasive. Applicant argues that the boundary interface at the fused part and the non fused part are not divided. If the materials were divided at the interface they would not adhere to one another. Thus the crystal phase and the amorphous phase must be mixed at least at the boundary between the magnetic body and the amorphous layer. JP '911 would meet this limitation as the magnetic body has a crystalline structure as the magnetic body is fused using a YAG laser. Following the fusing process an amorphous layer is applied surrounding the fused (crystalline) layer (Paragraph 0005).

Claim 4
Claim 4 is amended to recite "the protecting layer includes aluminum."
Kako discloses a nickel-plated layer formed on the surface of the amorphous layer. See paragraph [0005] of Kako. Thus, Kako fails to teach or render obvious that the protecting layer includes aluminum. Ishizake and Fuji fail to cure the deficiencies of Kako. The applied references fail to teach or render obvious the recited features of independent claim 4.

Applicants arguments are not persuasive as applicants selection of the protective layer comes from a laundry list of materials that include nickel, aluminum, tantalum, zirconium, hafnium, niobium, silicon, titanium, magnesium, chromium, barium, molybdenum, vanadium, tungsten, zinc, strontium, iron, bismuth, boron, calcium, gallium, germanium, lanthanum. One of ordinary skill in the art would substitute a nickel layer with aluminum. Without some showing of unexpected results one would have chosen aluminum or a nickel for use as a protective layer. It would have been obvious to one of ordinary skill in the art to utilize an aluminum passivation layer passivated by chemical conversion treatment of the amorphous layer on the amorphous layer as taught by Hamada as this would improve the corrosion resistance of the film. One would have been motivated to include the aluminum passivation layer (oxidized) in the JP '911 invention as this would roughen the surface and promote vapor deposition. One of ordinary skill would recognize aluminum as an easily oxidized material used on a surface would allow for improved corrosion resistance in the form of aluminum oxide.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to GARY D. HARRIS whose telephone number is (571)272-6508. The examiner can normally be reached on 8AM - 5PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Ruthkosky can be reached on 571-272-1291. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Mark Ruthkosky/
Supervisory Patent Examiner, Art Unit 1785

/G. D. H./Gary Harris
Examiner, Art Unit 1785